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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/527,887	08/18/2005	Jeremy John Hawkes	41577/313584	5844

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EXAMINER

CHRISTENSEN, RYAN S

ART UNIT	PAPER NUMBER
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2856

DATE MAILED: 08/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/527,887

Applicant(s)

HAWKES ET AL.

Examiner

Ryan Christensen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-12, 19 and 20 is/are rejected.
- 7) ☒ Claim(s) 5, 6, 13-18 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4/29/2005</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 8 and 11 are objected to because of the following informalities:
2. Claim 8 is a little unclear there, appears to be a typo or a missing word.
3. Claim 11 appears to have a typo where "untrasound" was intended to read "ultrasound." Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,711,888 (Trampl et al.). With respect to claim 1, Trampl et al. disclose an apparatus and a method for directing particles entrained in a fluid (abstract), comprising a chamber having a first wall (A and B in Fig. 1) including means for generating a sound wave having a frequency ν (driving frequency f_e , and resonators Col. 16) and a second opposite wall capable of reflecting the sound wave (M, Fig. 1) in which the first and the second wall define a conduit for the passage of the fluid (Fig. 1) and in which the thickness of the second wall is such that the path length of the standing wave in the second wall is a multiple of about $\frac{1}{2}$ the wavelength of the sound wave there in (Col. 17, lines 60-67).

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6. Please note that the path length of the standing wave in the second wall is equal to this distance the standing wave travels through the mirror layer and then through the mirror layer again as it is echoed or reflected back. Therefore, the path length of the standing wave in the second wall is equal is equal to two times the thickness of the said second wall, which will be .
7. This provides the following mathematical representation of the relationship between the path length in the second wall and the wavelength as claimed:

$$(\text{equ. 1}) \quad 2x = N \cdot \frac{1}{2} \cdot \lambda_r$$

which can be algebraically simplified to:

$$(\text{equ. 2}) \quad x = N \cdot \frac{1}{4} \cdot \lambda_r$$

where x is the thickness of the second wall

and λ_r is the wavelength of generated sound wave in the second wall

and N is some integer

8. Trampler et al. disclose the optimum thickness for the second wall is found through the equation:

$$(\text{equ. 3}) \quad 2\pi \cdot x \cdot f_e / v_m = \pi/2$$

where f_e is the driving frequency of the generated sound wave

and v_m is the velocity of the sound wave in second wall

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9. The wavelength of the sound wave in the second wall is related as follows:

(equ. 4) $\lambda_r = v_m / f_e$

where v_m is the velocity of sound in the second wall

and f_e is the driving frequency of the sound wave

10. Substituting equation 4 into equation 3 and simplifying we arrive at

(equ. 5) $x = 1/4 * \lambda_r$

11. Trampler et al. go on to disclose a using a second wall which is an integer multiple of this optimum thickness (Col. 17, lines 65-67). Therefore, Trampler et al. disclosed the claimed relationship in equation 1 where $N=3$.
12. With respect to claim 2, Trampler et al. disclose a coupling layer (B)
13. With respect to claim 4, Trample et al. further disclose that the thickness of the material transmitting the sound wave (B) is an of multiple of $\frac{1}{2}$ the wavelength of the sound wave there in. See the equation on Column 17, at line 44 and lines 35-42.
14. With respect to claim 7, Trampler et al. disclose peizoceramic for generating a sound wave in these systems (Col. 16, lines 33-34).

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15. With respect to claim 8, Trampler et al. disclose the generated frequency (f_e , Col. 17, lines 57) being near the resonate frequency of the piezoceramic material (Col. 16, lines 40-41).
16. With respect to claim 9, Trampler et al. disclose that the second wall (mirror) is made of glass (Col. 17, line 10).
17. With respect to claim 11, Trampler et al. disclose the wave being an ultrasound wave (abstract).

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
19. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:
 1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
20. Claims 3, 4, 10, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,711,888 (Trampler et al.) in view of an article

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entitled "Force field particle filter, combining ultrasound standing waves and laminar flow" (Hawkes et al.).

21. With respect to claims 3 and 20, Trampler et al. does not explicitly disclose the width of the conduit being a multiple of $\frac{1}{2}$ or $\frac{1}{4}$ for the wavelength of the sound wave in fluid. However, Hawkes et al. disclose the depth (width) being $\frac{1}{2}$ the wavelength of the sound wave there in (See the table in Col. 1 of page 214). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system taught by Trampler et al. by including the width being $\frac{1}{2}$ the wavelength of the sound wave there in, as disclosed in Hawkes because it is known in the art to do this in order to efficiently separate particles
22. Likewise, with respect to claim 20, it would be obvious to one of ordinary skill in the to construct the width of the conduit at $\frac{1}{4}$ of the wavelength of the sound in fluid.
23. With respect to claim 10, Trampler et al. do not explicitly disclose the first wall being made of steel. However, Hawkes et al. disclose the first wall being made of steel (Page 214, first line of section 3.1). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system taught by Trampler et al. by constructing first wall out of steel because steel is well known in the art for this purpose.
24. With respect to claim 12, Hawkes et al. suggests a particle counter adjacent to one of the walls (Hawkes, Page 217). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the system taught in

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modify the taught by Trampler, by including a particle detector by adding a particle detector, as disclosed in Hawkes, because It is well know to filter substances before making measurements depending on the constituents being measured.

Allowable Subject Matter

25. Claims 5,6,13-18 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


Conclusion

26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan Christensen whose telephone number is 571-272-2683. The examiner can normally be reached on Monday - Friday, 8am - 5pm.
27. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.
28. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

RC


DANIEL S. LARKIN
PRIMARY EXAMINER